Onzen
Technical Guide

North American Topside

Onzen + Sea Salt = Natural Salt Water care made easy.

Table of Contents

1 Onzen Technical Guide..... 3

1.1 Obtaining Technical Data For Your Spa..... 3

1.2 Revision Summary..... 3

1.3 What is Onzen? 3

1.4 What Does Onzen Do?..... 3

1.5 What Are The Benefits of Onzen?..... 3

1.6 How Does Onzen Work? 3

1.7 Onzen Version Summary..... 4

1.8 Onzen Version Table 4

1.9 Onzen Version – Spa Owner Details..... 4

1.10 How to Determine Spa Production Date 4

1.11 Definitions of Terms..... 5

1.12 Water Chemistry Abbreviations/Acronyms & Levels..... 8

1.13 Low Level Settings Abbreviations Acronyms & Settings..... 8

1.14 Onzen Warranty..... 10

1.15 Onzen Start – Up Guide..... 11

1.15.1 Onzen Start-Up Overview Flowchart 11

1.15.2 Fill Spa With Water Power Up Spa and Set Water Temperature..... 12

1.15.3 Program Filtration Cycles/Filtration Duration and Stabilise Spa Water..... 13

1.15.4 Establishing Correct Water Chemistry 15

1.15.5 Arctic Spas Onzen Salt Dose Guidance Table 17

1.15.6 Using Sodium Chloride Test Strips 18

1.15.7 Program Onzen Settings 20

1.15.8 Conducting Ozone and Sanitizer Production Test 21

1.15.9 Sanitizer Readings..... 24

1.16 Onzen Cloudy Water Troubleshooting Flowchart 25

1.17 Onzen Frequently Asked Questions..... 26

1.18 Arctic Spas Onzen Maintenance Schedule..... 28

1 Onzen Technical Guide

1.1 Obtaining Technical Data For Your Spa

To ensure you have the current appropriate technical data for your spa it is recommended that you obtain such data from your authorised retailer or from the Arctic Spas Web Site http://arcticspas.com.

1.2 Revision Summary

This publication has been fully revised to provide the supporting details for Onzen Version 7 and Onzen Version 8, and supersedes all other Onzen Technical Guidance publications released by Arctic Spas.

1.3 What is Onzen?

Onzen is an all-natural, salt-water softening and maintenance system.

1.4 What Does Onzen Do?

- Softens water.
- Clarifies water.
- Breaks down contaminants with ozone, automatically.
- Adds back up sanitizing (Chlorine) agents, automatically.

1.5 What Are The Benefits of Onzen?

- Makes skin feel soft and smooth.
- Makes water look sparkling clean.
- Reduces contact with harsh chemicals.
- Dramatically reduces time and money needed to maintain spa water.
- Reduces impact to the environment:
    1. Fewer trips to the spa store for supplies.
    2. Less packaging wasted on chemical containers.
    3. Less industrial waste produced making spa chemicals.

1.6 How Does Onzen Work?

- Natural mineral sea salt blend is added to water when spa is filled.
- Ozone continuously breaks down contaminants in the water.
- Unique hybrid ozone technology makes more ozone without corrosion.
- Sanitizing agents (Chlorine) are produced and mixed with water, automatically.
- Output is easily controlled to suit very low to very high use.

1.7 Onzen Version Summary

Through the goal to be recognized as the company that building the best spas available you will find that from time to time Arctic Spas will release an upgraded version of Onzen as it does with all Spa components. The upgrade in most cases will be related to the introduction of an enhanced Onzen Output Electrode. When it is time to replace an exhausted Onzen Output Electrode it is suggested to replace the electrode with the latest version available. Your Spa retailer will be able to advise you what version of Onzen was fitted in your spa during manufacture.

1.8 Onzen Version Table

The following table provides the release dates for the past two Onzen versions.

ONZEN VERSION	RELEASE DATE	COMMENTS
Version 7	Nov 2009	
Version 8	Dec 2010	Changed electrode housing to one that was in the bather load, did not require waterflow and had a user removable electrode.

1.9 Onzen Version – Spa Owner Details

The following table provides a place for you to record the Onzen version details for your spa.

ONZEN VERSION	SPA BUILD	RELEASE DATE	SPA SERIAL NO.

1.10 How to Determine Spa Production Date

The Spa production date can be determined from the Spa Serial Number recorded on the Spa Identification Plate mounted on the cabinet usually under the topside controller.

Example

Spa Serial No. **A10H131112**

- The two digits following the first letter represent the year that the Spa was built 10 = 2010.
- The letter following the first two digits represent the month that the Spa was built H = August.

1.11 Definitions of Terms

TERM	DEFINITION
Onzen	An all-natural, salt-water softening and maintenance system.
Onzen Output Electrode	Platinum-iridium Titanium electrode - equipped salt cell converts the saltwater solution to sanitizer, and as this solution reverts back to its natural form (salt) after sanitizing. Unless large volumes of water are added to the spa you never have to add more salt.
Onzen Output Electrode Version	Modification status of the electrode fitted to the spa.
Calcium Hardness (CH)	Calcium Hardness is a measure of the total amount of dissolved calcium salts in the water. CH helps determine how scaling or corrosive the water is. It is believed that calcium helps control the corrosive nature of water. Calcium has two major problems in Hot Water Chemistry: 1. CH has a tendency to precipitate (fall out of suspension in high temperatures. 2. High pH will cause calcium to precipitate. The problem with calcium falling out of suspension is that it collects on the heater and pump, and shortens their life. Any natural corrosiveness in the water can be combated by maintaining a slightly higher Total Alkalinity Level.
Alkalinity Total Alkalinity (TA)	A measure of how stable the pH is (a measure of the total levels of carbonates, bicarbonates, hydroxides, and other alkaline substances in the water). TA is referred to as the water's ""pH buffer"". In other words, it's a measure of the ability of the water to resist changes in pH level. **If the TA is too low**, the pH level will fluctuate widely from high to low. Fluctuations in pH can cause corrosion or scaling of the spa components. **Low TA** can be corrected by adding Arctic Pure, Perfect Balance to the spa water. **If the Total Alkalinity is too high**, the water will be more susceptible to scale and high pH. High pH may be difficult to bring down. Note: Salt systems naturally drive pH levels to increase. **High TA** can be lowered by adding Arctic Pure, Adjust Down to the spa water. Once the TA is Balanced, it normally remains stable, although some sanitizers, and the addition of more water with a high or low alkalinity will raise or lower the TA reading of the water.

TERM	DEFINITION
Potential Hydrogen (pH)	The pH level is the measure of alkalinity. Maintaining a Balanced pH level is extremely important for: · Optimizing the effectiveness of the sanitizer. · Maintaining water that is comfortable for the user. · Preventing equipment deterioration. · **Note: Salt systems naturally drive pH levels to increase, strive to achieve a Balanced pH level.** **If the spa water's pH level is too low, the following may result:** · The sanitizer will dissipate rapidly. · The water may become irritation to spa users. · The spa's equipment may corrode. **Low pH** can b raised by adding Arctic Pure, Adjust Up to the spa water. **If the pH level is too high, the following may result:** · The sanitizer is less effective. · Scale will form on the spa shell surface and the equipment. · High pH will cause calcium to precipitate (fall out of suspension). · The water may become cloudy. **High pH** can be lowered by adding Arctic Pure, Adjust Down to the spa water. It is important to check the pH on a regular basis. The pH will be affected by the bather load, the addition of new water, the addition of various chemicals, and the type of sanitizer used.
Chlorine Free Chlorine (FCL)	FCL is the active form of chlorine that actually kills bacteria and algae (It is a Sanitizer). Sanitizer is extremely important for killing algae, bacteria and viruses, and preventing unwanted organisms for growing in the spa. At the same time, you don't want too high a sanitizer level, or it can irritate your skin, lungs and eyes. Always maintain the sanitizer level in your spa at the recommended level for each type of sanitizer.
Chlorine Residual	The actual level of chlorine in the water after the chlorine demand has been satisfied.
Sanitizer	Chemical used to kill bacteria. Generic names: Chlorine, Bromine. **Arctic Pure, Boost or Refresh.**

TERM	DEFINITION
Parts Per Million (ppm)	ppm: parts per million, a standard measure of chemical or mineral concentration.
Organic waste	Debris such as microorganisms, perspiration, urine, etc. which needs to be burned up or "oxidized" regularly to prevent haze, algae, chloramines, etc.
Shock	An oxidizer that "burns off" the organic wastes which cause cloudiness and algae. It is a generic term for a chemical used to oxidize organic wastes. Arctic Pure, Boost.
ORP	Oxidation–Reduction Potential. This is simply a measurement of the water's ability to cleanse itself. ORP is measured in millivolts (mV).

1.12 Water Chemistry Abbreviations/Acronyms & Levels

ABBREVIATION/ACRONYMS	DEFINITION CORRECT	CHEMICAL LEVELS
CH	Calcium Hardness	50 - 150 ppm
TA	Total Alkalinity	80-100 ppm
pH	Potential Hydrogen	7.2 – 7.6 ppm
FCL	Free Chlorine	1 – 3 ppm
ORP	Oxidation–Reduction Potential	600 - 1000

1.13 Low Level Settings Abbreviations Acronyms & Settings

ABBREVIATION/ ACRONYMS	DEFINITION	SETTING 2 PUMP SPA	SETTING 3 PUMP SPA
bL	Blower (Therapy Air)	**bL 1** (Installed) **bL 0** (Not installed)	**bL 1** (Installed) **bL 0** (Not installed)
CC	Cooling Cycle	**CC 0**	**CC 0**
CF	Clean Filter Reminder	**CF 0 (Off)**	**CF 0 (Off)**
CP	Chlorine Production (Onzen Cycle Duration) **CP 0 indicates that Onzen is off.** **CP 1** indicates Onzen runs 4 hours daily. **CP 2** indicates Onzen runs 8 hours daily. **CP 3** indicates Onzen runs 12 hours daily. **CP 4** indicates Onzen runs 16 hours daily. **CP 5** indicates Onzen runs 20 hours daily. **CP 6** indicates Onzen run 24 hours daily.	**CP 4** (16 Hours) is the suggested setting for Start Up - first 24 hours. Following Start Up it is recommended to set Onzen Cycle Duration between 2-4 hours. Then monitor and adjust according to spa usage and bather load.	**CP 4** (16 Hours) is the suggested setting for Start Up - first 24 hours. Following Start Up it is recommended to set Onzen Cycle Duration between 2-4 hours. Then monitor and adjust according to spa usage and bather load.
dH	Delay Heater	**dH 2**	**dH 2**
FC	Filter Control **FC 0** indicates that the spa will stop filtering 2 degrees above the set water temperature. FC 1 indicates that the spa will always filter.	**FC 0**	**FC 0**

ABBREVIATION/ ACRONYMS	DEFINITION	SETTING 2 PUMP SPA	SETTING 3 PUMP SPA
Fd	Filter Cycle Duration Fd 00 = no filtration. Fd 01 = 1 hour/cycle. Fd 02 = 2 hour/cycle.	Fd 1 (suggested)	Fd 1 (suggested)
FF	Filter Cycle Frequency FF 1 = 1 cycle in 24 hours. FF 2 = 2 cycles in 24 hours. FF 3 = 3 cycles in 24 hours. FF 4 = 4 cycles in 24 hours.	FF 4 (suggested)	FF 4 (suggested)
P2	Pump 2	P2 1	P2 1
P3	Pump 3	P3 0 = Spa not equipped with 3rd pump	P3 1

1.14 Onzen Warranty

Arctic Spas warrants the Onzen natural salt-water care system against malfunctions due to defects in materials and workmanship for 2 years from the original date of delivery to the original customer on factory installed systems. This warranty includes parts and on site labour necessary for the repair.

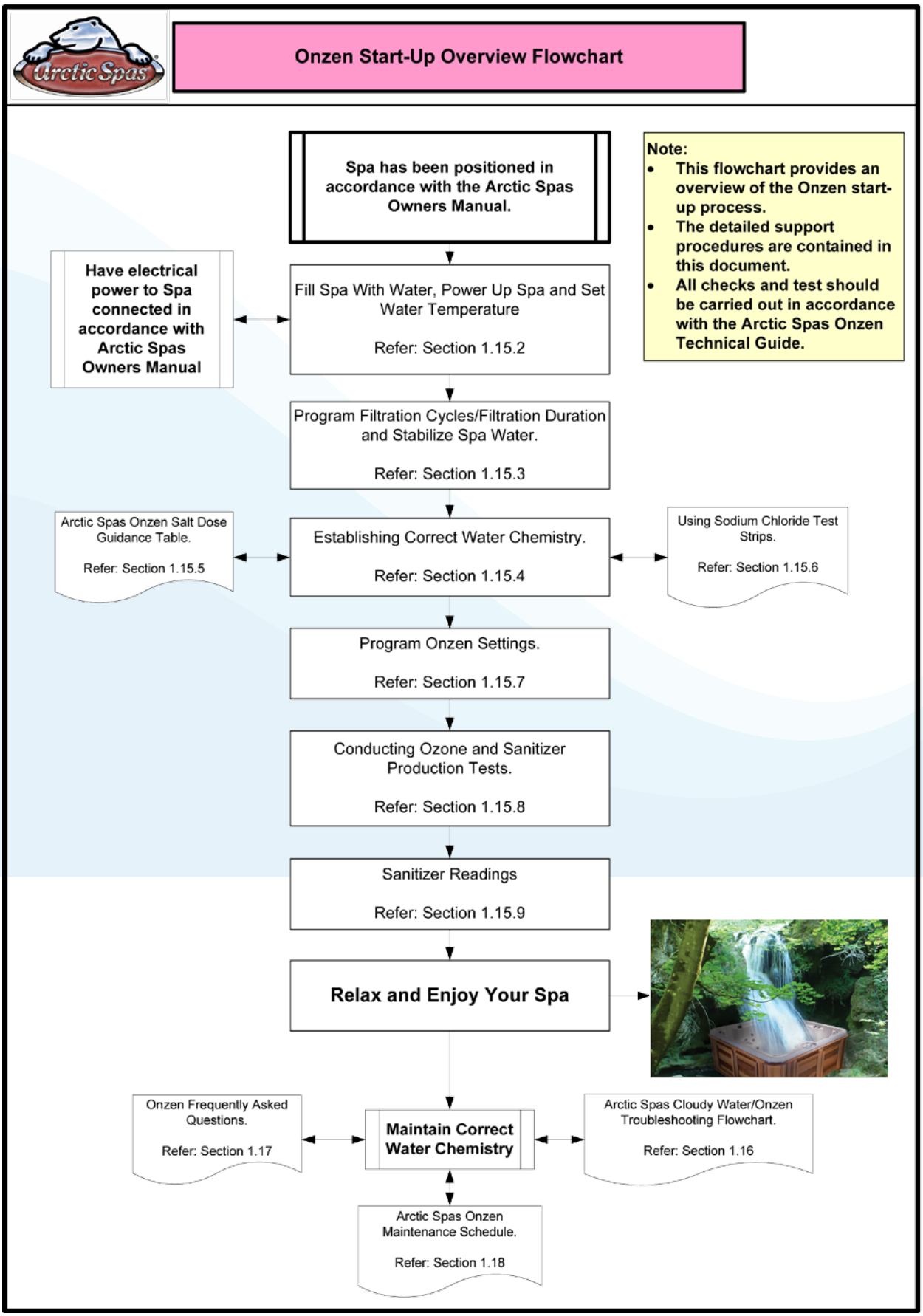
Spa water quality and other damages resulting from water imbalance are specifically not covered by this warranty. Warranty work must be completed by authorized Arctic Spas retailers only. No labour warranty is provided by Arctic Spas for Onzen systems installed on site, only faulty parts are covered.

Disclaimer: this is not an automatic water care system. The system is set up for typical hot tub use. “Boost” may be needed to supplement sanitizer generation with higher hot tub use.

The spa user is ultimately responsible for maintaining proper sanitary water conditions. Use of salt other than Arctic Pure sea salt blend will damage the components and void the warranty. The Arctic Pure blend has been developed to protect Onzen components from damage and the use of alternative salt blends will be easily detected by technicians.

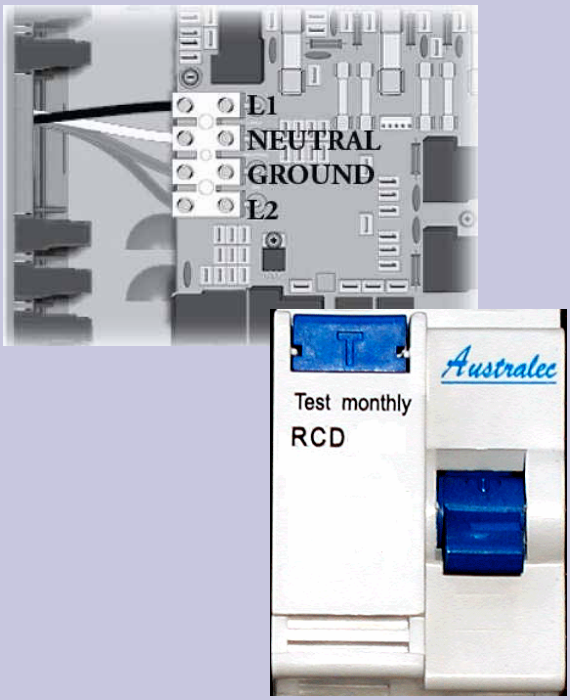
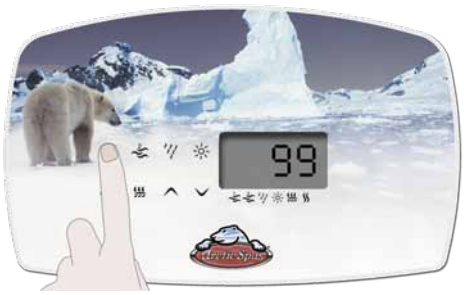
1.15 Onzen Start – Up Guide

1.15.1 Onzen Start-Up Overview Flowchart


Onzen Start-Up Overview Flowchart
Spa has been positioned in accordance with the Arctic Spas Owners Manual.
Note:
This flowchart provides an overview of the Onzen start-up process.
The detailed support procedures are contained in this document.
All checks and test should be carried out in accordance with the Arctic Spas Onzen Technical Guide.
Have electrical power to Spa connected in accordance with Arctic Spas Owners Manual
Fill Spa With Water, Power Up Spa and Set Water Temperature
Refer: Section 1.15.2
Program Filtration Cycles/Filtration Duration and Stabilize Spa Water.
Refer: Section 1.15.3
Arctic Spas Onzen Salt Dose Guidance Table.
Refer: Section 1.15.5
Establishing Correct Water Chemistry.
Refer: Section 1.15.4
Using Sodium Chloride Test Strips.
Refer: Section 1.15.6
Program Onzen Settings.
Refer: Section 1.15.7
Conducting Ozone and Sanitizer Production Tests.
Refer: Section 1.15.8
Sanitizer Readings
Refer: Section 1.15.9
Relax and Enjoy Your Spa
Onzen Frequently Asked Questions.
Refer: Section 1.17
Maintain Correct Water Chemistry
Arctic Spas Cloudy Water/Onzen Troubleshooting Flowchart.
Refer: Section 1.16
Arctic Spas Onzen Maintenance Schedule.
Refer: Section 1.18

1.15.2 Fill Spa With Water Power Up Spa and Set Water Temperature

The following steps provide guidance to help establish correct chemically balanced water. To help ensure chemicals dissolve appropriately it is good practice to first mix/dissolve the chemical in an uncontaminated container of hot water before carefully adding to the spa water.

Steps to Fill Spa With Water Power Up Spa and Set Water Temperature	
	Step 1. Fill Spa Fill your spa through the filter intake as shown to the appropriate level (just under the head rests). If you have sediment or high mineral content a "carbon filled pre-filter", as pictured, can help. (This is optional and will prolong the fill time).
	Step 2. Connect/Turn on Electrical Power to the Spa Once the spa is filled to the proper level, connect power to the spa in accordance with the Arctic Spas Owners Manual, and turn the power on to the spa on.
	Step 3. Set Water Temperature Set the water temperature control on the Topside Controller to the desired temperature (between 100ºF and 104ºF or 38°C and 40°C or).

1.15.3 Program Filtration Cycles/Filtration Duration and Stabilise Spa Water

The system will automatically perform 4 filtration cycles per day, 6 hours apart.
During a filtration cycle, the following sequence is executed:

- Pump 2, Pump 3 (on 3 pump systems) and Blower start at high speed for 1 minute.
- Pump 1 then starts and runs at low speed for the preset number of hours.
- Ozone output is turned on.

To set the filtration cycle duration and number of filtration cycles for a 24 hour period, follow this procedure:

<table>
<tr><th colspan="2">Steps to help Set Filtration Duration and Filtration Cycles & Stabilise Water</th></tr>
<tr><td>
</td><td>Step 1. Set Filter Cycle Duration

Press the Filter Cycle Key.

The Filter Cycle Duration details “Fd” will be displayed “Fd XX” .

Use up/down arrow keys to change the Filter Cycle Duration.

Fd 00 = no filtration.
Fd 01 = 1 hour cycle.
Fd 02 = 2 hour cycle.
FD 01 is suggested

Press the Filter Cycle Key again to scroll forward.
The Filter Cycle Frequency details will be displayed.</td></tr>
<tr><td>
</td><td>Step 2. Spa Filter Cycle Frequency

The display now shows the number of cycles (FFxx) where “xx” is the number of filter cycles in a 24 hour period.

Select from 1 cycle to 4 cycles per day using the arrow keys.

FF 04 is suggested

Press the Filter cycle key to accept it.

Filter cycle key to exit Low Level Settings.
A filter cycle will start immediately.

The Filter Cycle triangular icon will appear on the display when a filter cycle is on.</td></tr>
</table>

Steps to help Set Filtration Duration and Filtration Cycles & Stabilise Water

Step 4. Stabilise Spa Water

Once Filtration cycles and filtration duration low level settings have been programmed place the insulated cover on the spa and allow the water temperature to stabilize (approximately 16 hours). Make sure you secure the cover in place using the cover locks. Periodically check the spa water temperature. When the water temperature climbs above 85°F, (29°C) proceed to the next step.
Note: As heat impacts both Calcium and Total Alkalinity a little it is best to heat the water above 29°C (85°F) before advancing to Establishing Correct Water Chemistry.

Over Temp During Filter Cycle

In order to prevent excessive water temperatures due to long Filter cycles during warm weather, the system has a special safeguard.

If the water temperature exceeds the set point by more then 2º F (1ºC), the system will cancel the Filter cycle and the Filter cycle icon will blink for the remainder of the filter cycle.

The Filter cycle icon blink pattern will be: ON for 1/2 second, OFF for 1/2 second, ON for 1/2 second, and then finally OFF for 1 1/2 seconds. This sequence will then repeat.

The filtration cycle will automatically reset itself once the water temperature falls below the set point.

Filter Cycle Suspension

During a Filter cycle, if an accessory (a pump, the blower, or the light) is used manually, the Filter cycle is suspended during the time that the accessories are used.

Once all accessories are turned off (whether manually or by built-in timer), the Filtration cycle remains suspended for an extra 40 minutes. When a Filtration cycle is suspended the Filtration cycle icon will blink.

1.15.4 Establishing Correct Water Chemistry

The following steps provide guidance to help establish correct chemically balanced water.

To help ensure chemicals dissolve appropriately it is good practice to first mix/dissolve the chemical in an uncontaminated container of hot water before carefully adding to the spa water.

Steps to Establish Chemically Balanced Water With Onzen	
	Step 1. Test and Adjust Calcium / Total Alkalinity (a) Test Calcium hardness. Level should be between 50-150 ppm. If high, lower with a stain & scale controller such as Arctic Pure, Best Defence, to help hold the Calcium in suspension. **NOTE: Salt systems perform best with Low Calcium levels.** (b) Test Total Alkalinity. It should be 80 – 100 ppm (100 max). If high, lower Total Alkalinity with Arctic Pure, Adjust Down (pH Down) or muriatic acid. Do not raise Total Alkalinity! **WARNING: Skipping these steps on Start-up can cause scaling problems and cloudy water that may not be covered under warranty.** **NOTE: Use all products according to directions on the bottle.**
	Step 2. Test and Adjust pH Test pH. Levels should be between 7.2 – 7.6. If pH is high, (over 7.6) add Arctic Pure, Adjust Down. If pH is low, (under 7.2) add Arctic Pure, Adjust Up. **NOTE: Use all products according to directions on the bottle.** **NOTE: Salt systems naturally drive pH levels to increase, strive to achieve a Balanced pH level.** **NOTE: High pH will cause calcium to precipitate (fall out of suspension). The problem with calcium falling out of suspension is that it collects on the heater and pump, and shortens their life.**
	Step 3. Mix Salt Crystals Dissolve 1/3 of the **minimum** recommended salt dosage in a 5 Gallon (20 litre) pail of hot water. **Refer Arctic Spas – Onzen Salt Dosage Chart contained in this guide.**

Steps to Establish Chemically Balanced Water With Onzen

Step 4. Add Salt to Spa Water & Test TA / pH

(a) Slowly pour the dissolved salt from the pail into the spa water.
(b) Run pumps for 5 minutes to help mix salt blend through.
(c) Wait 1 hour.
(d) Then test and adjust Total Alkalinity level accordingly.
(e) Then test and adjust pH level accordingly.

Refer to steps 3 and 4 for correct TA/pH levels.

Step 5. Repeat Step 3 & 4

Repeat steps 5 and 6, ensuring all sub steps are carried out accordingly.

Step 6. Repeat Step 3 & 4

Repeat steps 5 and 6, ensuring all sub steps are carried out accordingly.

Step 7. Test Sodium Chloride Level

You will now need to test sodium chloride levels.

Refer 'Using Sodium Chloride Test Strips' for details.

If sodium chloride levels are low, dissolve 1/2 lb (225 Grams) of salt (using cup provided) into hot water. Pour the dissolved salt into the spa water. Test sodium chloride level.

Repeat until required sodium chloride level is reached:

Onzen Version	Minimum	Maximum
Version 7	2000 ppm	3000 ppm
Version 8	1200 ppm	1500 ppm

Note: The Arctic Spas Onzen Salt Chart in this guide provides the estimated impact of adding ½ lb (225Grams) of salt to your spa.

Note: For start up it is recommended to strive for the minimum salt dosage. Once a Sodium Chloride reading has been taken and the minimum salt dosage achieved, it can be increased slightly to accommodate spa usage and bather load, if increasing the Onzen run time does not adequately increase the Chlorine Residual. Having the minimum amount of salt concentration unless the Onzen system is unable to maintain the proper Chlorine Residual, will reduce potential corrosion and increase the life of the Onzen Output Electrode.

1.15.5 Arctic Spas Onzen Salt Dose Guidance Table

The following table identifies the salt quantity required for each Arctic spa model and estimated impact of adding half pound (225g) of salt.
For start up it is recommended to strive for the minimum salt dosage. Once a Sodium Chloride reading has been taken and the minimum salt dosage achieved, it can be increased slightly to accommodate spa usage and bather load, **if increasing the Onzen run time does not adequately increase the Chlorine Residual. Having the minimum amount of salt concentration unless the Onzen system is unable to maintain the proper Chlorine residual,** will reduce potential corrosion and increase the life of the Onzen Output Electrode.

Arctic Spas - Onzen Salt Dosage Chart												
Spa Model	Water Volume Metered Fill Point (Bottom of Head Rest)		Required Salt Dosage Onzen Version 7 Min 2000 Max 3000				Required Salt Dosage Onzen Version 8 Min 1200 Max 1500ppm				Estimated Impact of Adding Extra Salt	
	Litres	US Gal	Min Kg	Max Kg	Min Lbs	Max Lbs	Min Kg	Max Kg	Min Lbs	Max Lbs	225 Grams	1/2 lb
Fox	875	231	1.77	2.65	3.90	5.85	1.06	1.32	2.34	2.92	255 ppm	255 ppm
Glacier	1131	299	2.28	3.43	5.04	7.57	1.37	1.71	3.02	3.78	195 ppm	195 ppm
Cub	1176	311	2.38	3.57	5.25	7.87	1.43	1.78	3.14	3.93	190 ppm	190 ppm
Klondiker	1264	334	2.55	3.83	5.64	8.46	1.53	1.91	3.38	4.23	175 ppm	175 ppm
Frontier	1267	335	2.56	3.84	5.65	8.48	1.53	1.92	3.39	4.24	175 ppm	175 ppm
Summit	1339	354	2.71	4.06	5.97	8.96	1.63	2.03	3.59	4.48	165 ppm	165 ppm
Yukon	1364	360	2.76	4.14	6.08	9.12	1.66	2.07	3.65	4.56	163 ppm	163 ppm
Kodiak	1492	394	3.01	4.52	6.65	9.98	1.81	2.26	3.99	4.99	150 ppm	150 ppm
Tundra	1614	426	3.26	4.90	7.20	10.80	1.96	2.45	4.32	5.40	138 ppm	138 ppm
Ocean	6000	1585	12.14	18.21	26.77	40.16	7.28	9.10	16.00	20.08	37ppm	37ppm

Note: Onzen Version 7 was released into production in November 2009. Note: Onzen Version 8 was released into production in December 2010.
Note: The Onzen Technical Guide provides supportive procedures for Onzen set up and Onzen settings.

1.15.6 Using Sodium Chloride Test Strips

The following steps provide guidance to help ensure sodium chloride test strips are used correctly.

Steps to Help Ensure Sodium Chloride Test Strips are Used Correctly	
	Step 1. Take Water Sample Take a sample of water from the spa in a small cup (about 25mm / 1" full). **NOTE: Always take water samples 25-30cm (12"-18") below the water surface.**
	Step 2. Place Test Strip in Water Sample Place the lower end of the strip into the water. IMPORTANT Keep top half of strip COMPLETELY dry to get an accurate reading.
	Step 3. Test Duration Period Leave strip in water for 3 – 5 minutes until yellow band at top of strip turns dark.
	Step 4. Obtain Readings Obtain your reading: where top of white peak falls on the number scale. Read top of peak to the nearest 0.2 division.
	Step 5. Correspond Test Result Reading Correspond the test result reading number with the numbers on the bottle.

Steps to Help Ensure Sodium Chloride Test Strips are Used Correctly

Step 6. Sodium Chloride Adjustment

The following levels are ideal:

Onzen Version	Minimum	Maximum
Version 7	2000 ppm	3000 ppm
Version 8	1200 ppm	1500 ppm

Note: The Arctic Spas Onzen Salt Chart in this guide provides the estimated impact of adding ½ lb (225 Grams) of salt to your spa.

Add or dilute water as needed.

- If Sodium Chloride reading is greater than the maximum level, add water.
- If Sodium Chloride reading is less than the minimum level, add salt.

Note: Once Sodium Chloride reading is in the ideal range salt concentration will only change if water is splashed or drained out and spa is replenished with water. Do not add salt unless this test confirms the level is below the ideal range.

Warranty: Use of salt other than Arctic Pure sea salt blend will damage the components and void the warranty. The Arctic Pure blend has been developed to protect Onzen components from damage and the use of alternative salt blends will be easily detected by technicians.

1.15.7 Program Onzen Settings

The Onzen CP Chlorine Production (Onzen Cycle Duration) settings need to be programmed:
The following steps provide guidance on how to program the Onzen system settings:

Steps to Program Onzen Settings	
	Step 1. Enter Low Level Settings Through Topside Controller Hold Filter Cycle key for 20 seconds, until "bL" displays. Scroll through to " CP " by repeatedly pushing the Filter Cycle key. The CP Chlorine Production details will be displayed.
	Step 2. Onzen CP Chlorine Production Duration – Set CP 4 Use up/down arrow keys to change the CP setting to "CP 4". **Note: CP 0 indicates that Onzen is off.** CP 4 (16 Hours) is the suggested setting for Start Up - first 24 hours. Following Start Up it is recommended to set Onzen Cycle Duration between 2-4 hours. Then monitor and adjust according to spa usage and bather load.
	Step 3. Exit Low Level Settings Exit the "low level setting" menu by repeatedly pushing the Filter Cycle key until the screen resets. *Programming Onzen settings is now complete.* Go to, 'Conducting Ozone and Sanitizer Production Tests' and Conduct an ozone and sanitizer production test. These tests will confirm that your Onzen system is producing and delivering ozone and sanitizer to the spa water.

1.15.8 Conducting Ozone and Sanitizer Production Test

The following steps provide guidance on how to conduct an ozone and sanitizer production test, which will confirm that your Onzen system is producing and delivering ozone and sanitizer to the spa water.

Is Ozone Being Produced & Delivered to Spa Water?	
	Step 1. Lower Spa Water Temperature Setting Turn the temperature setting below your actual temperature by 2 degrees. Use the Down Arrow key ⌄ to lower the temperature.
	Step 2. Activate Spa Filtration Cycle Activate the spa Filtration Cycle by pressing the Filter Cycle key ≋ 3 times.
	Step 3. Remove Cabinet Door Remove the cabinet door in front of the Onzen Generator, with an Allen Key.
BLUE LIGHT	**Step 4. Confirm blue Light Omitting from Onzen Generator** Check to confirm that a blue light glow is emitting from the Onzen Generator (It is much easier to confirm a blue light glow is emitting in a dark environment or when it is dark). Blue light glow emitting from the Onzen Generator confirms ozone is being produced. If Blue light glow is not emitting from the Onzen Generator, Dealer service may be required.
	Step 5. Look for bubbles and water flow Look for bubbles and water flow coming from the spa footwell. Bubbles indicate Ozone is being delivered to water. If no bubbles are sighted, this could indicate a blockage in the Onzen plumbing, Cycle PUMP 1 on HIGH SPEED repeatedly. If this does not work, Dealer service may be required. Go to - Is Sanitizer Being Produced and Delivered to Spa Water.

Is Sanitizer Being Produced and Delivered to Spa Water?

This test requires:
- The water temperature to be at least 80º F (27 º C).
- The Filter Cycle Duration to be set to 00.
- CP Chlorine Production Time (Onzen Cycle Duration) programmed to CP 6. Onzen system will run for 24 hours per day.

Step 1. Set Filtration Cycle Time to Fd 00 (= No Filtration)

Press the Filter Cycle Key.
The Filter Cycle Duration details "Fd" will be displayed "Fd XX" .

Use down arrow key to change the Filter Cycle Duration to Fd 00.

This de-activates the filtration pump so you can see the mist of gas bubbles produced by the Onzen System.

Step 2. Go into Low Level (LL) Setting

Hold the Filter Cycle key down for 20 seconds until "bL 0 OR bL 1" is displayed.

Step 3. Scroll to CP (Chlorine Production) Settings

Scroll through the Low Level (LL) settings by pressing the Filter Cycle key until it reads "CP X ". ("x" will be a value between 0 & 6).

Step 4. Change CP Setting to CP 6

Change CP setting to CP 6.
CP 6 programs the Onzen system to produce Chlorine 24 hours daily.

Step 5. Scroll Through Low Level Settings

Continue scrolling through the Low Level settings by repeatedly pushing the Filter Cycle key until the pack resets.

Is Sanitizer Being Produced and Delivered to Spa Water?

Step 6. Software Revision

The software revision will flash for 5 seconds.

If any keys are pushed at this stage, you will need to re-start the test from step 1.

Step 7. Confirm Onzen Output Electrode is Releasing a Fine Mist of SMALL Bubbles

Before touching any spa control keys, locate the Onzen Output Electrode in the foot well of the spa. There should be a fine mist of small bubbles coming from the fitting within a minute or two.

If no bubbles are visible, dealer service may be required.

Note: You can still sanitize your spa with granular chlorine!

Step 8. Allow to Produce Sanitizer

If you see bubbles, sanitizer is being produced.
Leave the Onzen system to produce sanitizer for the next few hours and make sure it does not shut off.
If you do not see these "fine misty small bubbles' call for service.

Step 9. Reset Filtration Settings

a. After a visual check, you can reset your Filter Cycle Duration.
   · **Fd 1 is suggested.**

b. Then reset your desired temperature.

Step 10. Install Cabinet Door

Install the cabinet door in front of the Onzen Generator.

1.15.9 Sanitizer Readings

The following provides guidance on the establishment and maintenance of sanitizer readings.

Sanitizer Readings

You should have sanitizer (Chlorine) readings within 24 hours.

On Start-up, you can add one capful of Arctic Pure "Boost" to the spa water.
Adding a capful of Arctic Pure Boost (Stabilized Chlorine) will establish an instant Free Chlorine level while the Onzen system is producing the residual. This will allow you to safely use the spa until an adequate residual is established.

If levels get too high, turn Sanitizer Production (Chlorine Production "**CP**") setting down. If you are not getting any readings, turn Sanitizer Production (Chlorine Production "**CP**") up.

The closer you monitor spa usage, bather load, monitor FCL and adjust Onzen Sanitizer Production Levels accordingly the less sanitizer you will need to add to your spa water.

Use Arctic Pure, Boost to sanitize the water after heavy usage, or if the Chlorine level is too low.

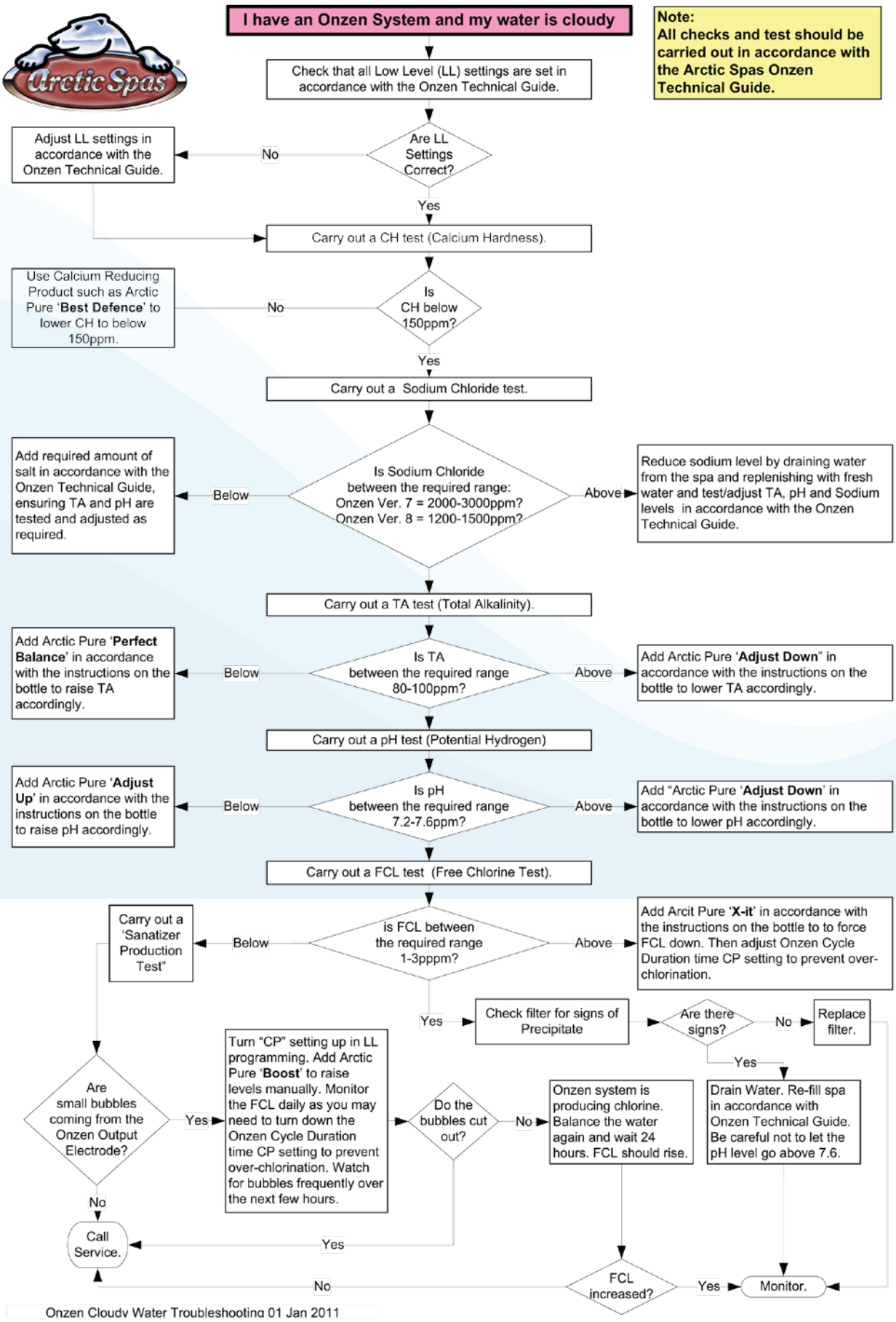
Important: Always test and balance the pH and Chlorine levels before each spa use.
* Expect the pH to increase slowly over each week and when it gets too high use Arctic Pure, Adjust Down to correct it.

High Ph will cause premature failure of the system, cloudy water, and decreased effectiveness of the sanitizer.

The Onzen system works best with low levels of calcium. Check your calcium hardness levels monthly to ensure long life of the spa equipment and maximum user enjoyment.

After adding a super chlorinating or oxidizer treatment such as Arctic Pure, Boost or Arctic Pure, Refresh to your spa, leave the cover open for a minimum of 20 minutes to allow the oxidizer gas to vent. A high concentration of trapped oxidizer gas, which may exist as a result of the shock treatment (not daily sanitation), may eventually cause discoloration or vinyl degradation to the bottom of the cover. This type of damage is considered chemical abuse and is not covered under warranty.

1.16 Onzen Cloudy Water Troubleshooting Flowchart


I have an Onzen System and my water is cloudy
Note:
All checks and test should be carried out in accordance with the Arctic Spas Onzen Technical Guide.
Check that all Low Level (LL) settings are set in accordance with the Onzen Technical Guide.
Are LL Settings Correct?
No
Adjust LL settings in accordance with the Onzen Technical Guide.
Yes
Carry out a CH test (Calcium Hardness).
Is CH below 150ppm?
No
Use Calcium Reducing Product such as Arctic Pure 'Best Defence' to lower CH to below 150ppm.
Yes
Carry out a Sodium Chloride test.
Is Sodium Chloride between the required range:
Onzen Ver. 7 = 2000-3000ppm?
Onzen Ver. 8 = 1200-1500ppm?
Below
Add required amount of salt in accordance with the Onzen Technical Guide, ensuring TA and pH are tested and adjusted as required.
Above
Reduce sodium level by draining water from the spa and replenishing with fresh water and test/adjust TA, pH and Sodium levels in accordance with the Onzen Technical Guide.
Carry out a TA test (Total Alkalinity).
Is TA between the required range 80-100ppm?
Below
Add Arctic Pure 'Perfect Balance' in accordance with the instructions on the bottle to raise TA accordingly.
Above
Add Arctic Pure 'Adjust Down" in accordance with the instructions on the bottle to lower TA accordingly.
Carry out a pH test (Potential Hydrogen)
Is pH between the required range 7.2-7.6ppm?
Below
Add Arctic Pure 'Adjust Up' in accordance with the instructions on the bottle to raise pH accordingly.
Above
Add "Arctic Pure 'Adjust Down' in accordance with the instructions on the bottle to lower pH accordingly.
Carry out a FCL test (Free Chlorine Test).
is FCL between the required range 1-3pppm?
Below
Carry out a 'Sanatizer Production Test"
Above
Add Arcit Pure 'X-it' in accordance with the instructions on the bottle to to force FCL down. Then adjust Onzen Cycle Duration time CP setting to prevent over-chlorination.
Yes
Check filter for signs of Precipitate
Are there signs?
No
Replace filter.
Yes
Drain Water. Re-fill spa in accordance with Onzen Technical Guide. Be careful not to let the pH level go above 7.6.
Are small bubbles coming from the Onzen Output Electrode?
Yes
Turn "CP" setting up in LL programming. Add Arctic Pure 'Boost' to raise levels manually. Monitor the FCL daily as you may need to turn down the Onzen Cycle Duration time CP setting to prevent over-chlorination. Watch for bubbles frequently over the next few hours.
Do the bubbles cut out?
No
Onzen system is producing chlorine. Balance the water again and wait 24 hours. FCL should rise.
No
Call Service.
Yes
FCL increased?
Yes
Monitor.
No
Onzen Cloudy Water Troubleshooting 01 Jan 2011

1.17 Onzen Frequently Asked Questions

Onzen Questions
Question 1: How do I know if the Onzen system is working?
Conduct a "Sanitizer Production test" (Also known as a Smoke test). This procedure activates the Onzen System while de-activating the filtration pump so you can see the mist of gas bubbles produced by the Onzen System.
Question 2: What should I do if it fails the "Sanitizer Production test"?
First, confirm you have the correct concentration of salt in the water "using sodium chloride test strips". Then, start maintaining your water manually using "Boost" granular chlorine to sanitize and Adjust Up/Adjust Down to balance pH. Continue to do this daily until the system is repaired by an authorized service technician. * Keep enjoying your hot tub!
Question 3: How do I know if the Ozone system is working?
Conduct an "Ozone Production test". This procedure activates the Ozone System through activating a filtration cycle so you can confirm: · That a blue light is omitting from the Onzen Generator. · There are bubbles and a flow of water coming from the Onzen Output Electrode located in the spa foot well.
Question 4: What should I do if no bubbles are sighted from the spa drain when the Ozone system test is conducted?
If no bubbles sighted during the Ozone System test, this could indicate a blockage in the Onzen plumbing, Cycle PUMP 1 on HIGH SPEED repeatedly. If this does not work, dealer service may be required. Refer Conducting An Ozone Production Test
Question 5: What should I do if the chlorine levels are too high?
Turn the Onzen Output down (decrease "CP" settings). Unless you added granular chlorine or shock to the water high chlorine levels mean the system is staying on too long for your circumstances. It may take a day or two for levels to normalize, or you can speed this process up by using a chlorine neutralizer, such as "X-it".
Question 6: What should I do if the pH keeps increasing?
Confirm that your Total Alkalinity is at the recommended level and reduce it manually with 'Adjust Down'. This is normal; all spa salt systems cause pH to increase.
Question 7: Will the salted water damage my lawn?
This is very unlikely. The recommended concentration of salt is used is approximately 10% of the concentration of sea water.
Question 8: Why is my water bright yellow, or bright green, or a rusty colour suddenly?
This can happen if the pH gets too high. Lower the pH using 'Adjust Down'. High pH is a sign that the Onzen Output may be turned up too high, so you may need to adjust the Onzen Output After balancing the pH and adjusting the Onzen Output wait about 48 hours. If the colour of the water does not normalize you may need to replace the water.

* Keep an eye on the pH and adjust it weekly to avoid this problem in the future.

Question 9 What is the typical amount of maintenance I need to do with Onzen?

1. Change the water twice a year.
2. Change the filter 4 times a year.
3. Check the Total Alkalinity weekly to make sure it is in the target range (Under 100).
4. Adjust the pH once a week. Salt systems naturally drive pH levels to increase, strive to achieve a Low pH level 7.2 must not exceed 7.6.
5. Check Calcium level monthly to ensure it is in the target range. Salt systems perform best with Low Calcium levels; strive for a target range between 50 - 150 ppm.
6. Adjust the Onzen Output "CP" if hot tub use changes significantly.
7. Adjust the chlorine levels using "Boost" granular chlorine, after heavy use or if the Onzen Output is too low.

Refer: Onzen Maintenance Schedule for further details.

Question 10 What should I do if the spa is not going to be in use or when I go on vacation?

(please see FAQ #5)

Question 11 Should I use Best Defence or another scale remover?

It is recommended that calcium be removed from the water in advance rather than adding a scale remover after the fact.

Question 12 What is the impact of phosphates on the Onzen system?

High levels of phosphates (above 250 ppb) may reduce the effectiveness of sanitizer output.

Question 13 What happens if my water becomes cloudy?

1. Test the water for chlorine content. If the level is low add Boost.
2. Check your filters as they may require replacement.
3. Check you pH level you may need to adjust you pH down.

Question 14 Can I use softened water with my Onzen system?

Yes.

You probably have a water softener because your water is quite hard. Your water-softener removes calcium from your water and helps you achieve water with calcium content near the target range, between 50 - 150 ppm.

Question 15 Prior to draining spa water for refill purposes should any form of system flush be carried out?

Yes you can, Arctic Pure 'Fresh Start'. Use in accordance with the instructions on the container. Flushing the system components and hoses is helpful when you get biofilm and calcium build-up.

It is good practice to do this at least once a year.

1.18 Arctic Spas Onzen Maintenance Schedule

The following table outlines the typical water maintenance program required for an Arctic Spa fitted with Onzen.
To help ensure chemicals dissolve appropriately it is good practice to first mix/dissolve the chemical in an uncontaminated container ofhot water before carefully adding to the spa water.

Item	Frequency	Maintenance Task	Target Range	Maintenance Action to Adjust/Correct
TA	Weekly	Check the Total Alkalinity to ensure it is in the target range.	**80 – 100 ppm**	**Low TA** - Can be raised by adding **Arctic Pure, Perfect Balance** to spa water. **High TA** - Can be lowered by adding **Arctic Pure, Adjust Down** to spa water.
pH	Weekly	Check the Potential Hydrogen to ensure it is in the target range.	**7.2 – 7.6 ppm**	Salt systems naturally drive pH levels to increase, strive to achieve a Low pH level 7.2. pH must not exceed 7.6. **Low pH** - Can be raised by adding **Arctic Pure, Adjust Up** to the spa water. **High pH** - Can be lowered by adding **Arctic Pure, Adjust Down** to spa water.
FCL	Weekly (& before each use)	Check the Free Chlorine Level to ensure it is in the target range. Adjust the chlorine levels using "Boost" granular chlorine, after heavy use or if the Onzen Output is too low.	**1 – 3 ppm**	**Low FCL** - Can be raised by adding **Arctic Pure, Boost** and or turning Onzen Cycle Duration (Chlorine Production **CP**) Level up. **High FCL** - Can be lowered by: • Natural cause over a few days. • Turning Onzen Cycle Duration (Chlorine Production **CP**) down. • Adding **Arctic Pure, X-it**. The above is dependent on FCL level, spa usage and bather load.
ORP	Refer FCL	Refer FCL Maintenance Task	**600–1000 mV**	Refer FCL Maintenance Action to Adjust/Correct.
CH	Monthly	Check Calcium Hardness level to ensure it is in the target range. *Salt systems perform best with Low Calcium Hardness levels.*	**50-150 ppm**	**High CH** - lower with a stain & scale controller such as **Arctic Pure, Best Defence**, to help hold Calcium in suspension.
Sodium Chloride	Monthly	Check the Sodium Chloride Level to ensure it is in the target range.	**Version 7** **2000 – 3000 ppm** **Version 8** **1200-1500 ppm**	Once Sodium Chloride reading is in the ideal range salt concentration will only change if water is splashed or drained out. Do not add salt unless this test confirms the level is below the chemical target range. **High Sodium Chloride** - add water. **Low Sodium Chloride** - add salt.
Onzen Output	As required	If spa use changes significantly, adjust the output level of Onzen Chlorine Production ("CP")	**2 - 4 Hours per day suggested**	Go into low level settings and adjust Onzen Cycle Duration (Chlorine Production **CP**) accordingly. Adjust to suit spa usage and bather load.
Filter	3 Monthly	Change the filter	N/A	Change the filter in accordance with Owners Manual instructions.
Water	6 Monthly	Change the water	N/A	Change the water in accordance with Owners Manual instructions.

Note: It is also good practice to take a water sample on a regular basis and have the water independently tested by your local spa/pool store.

Onzen Technical Support Line: 1-780-789-2646
or E-mail: onzen@goarctic.com